IVC

Owner's Reference Manual
IVC-800
Color Video Recorder

Before your IVC-800 left the factory, all phases of its performance were carefully checked with sensitive test instruments. This individual unit equalled or exceeded all current specifications for its model. Hence, if properly used, it should meet your most exacting requirements.

This manual has been prepared so that you may realize the full potential of the quality features engineered into your recorder. It is suggested that you first read the manual carefully, operating the controls to become familiar with their functions. When you are ready to perform the various functions, use of the index at right will provide a convenient means of locating the desired section.

NOTICE

Television programs may be copyrighted. Recording of such material, particularly if for commercial purposes, may be contrary to provisions of the United States copyright laws.

CAUTION

The IVC-800 recorder utilizes power transformers which provide isolation from the power line. The IVC-800 should not be connected with any television monitor or receiver which does not provide similar isolation from the a-c line.

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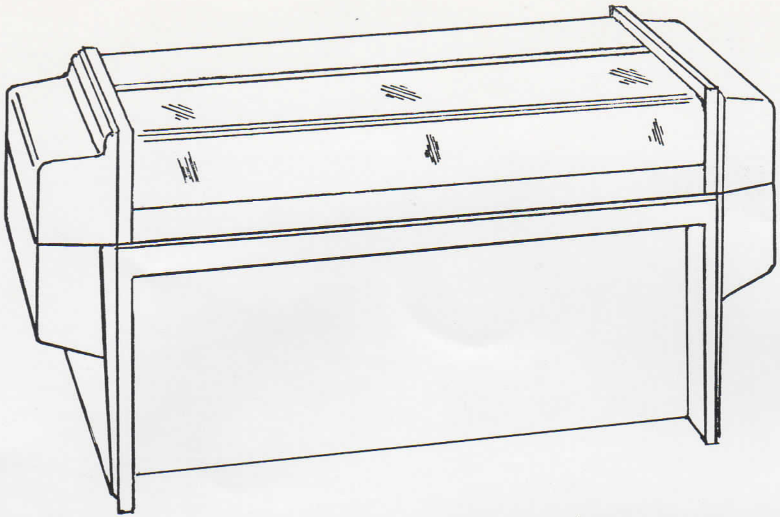

'RAPID-FIND' INDEX

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Hold the index edge between thumb and forefinger, flip pages until panel (white, colored, black, or gray) appears underneath desired index pages.

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GENERAL DESCRIPTION

The International Video Corporation Model IVC-800 video recorder/reproducer is a high performance, professional recorder with standard NTSC color capability. It is a compact, portable, fully transistorized video tape recorder/reproducer designed for use in industrial, educational, medical, military and other closed circuit television applications. It records and plays back NTSC color signals without pilot signals or high banding and can be used with any 60 field system. The composite video input can be from any standard source such as monochrome or color cameras using either EIA or industrial synchronization or from off-the-air receivers. The IVC-800 will record one hour of color or black and white video and audio signals on a single 8-inch reel of 1-inch tape, with a horizontal resolution in excess of 400 lines.

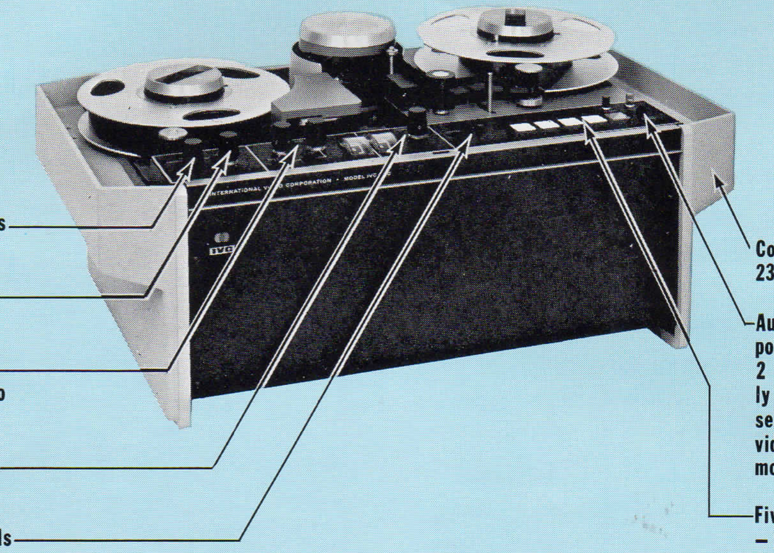
The frequency range required to give good video recordings extend from a few cycles per second to several million cycles per second. In order to record such a range of frequencies, a high head to tape speed (or writing speed) must be available. The high writing speed is obtained by mounting the video head on a disc and rotating it at a speed of 3600 rpm. The tape is wrapped around a drum at a 4.8° helix and moved longitudinally at a speed of only 6.91 inches per second. The tape movement and head rotation give a video recording speed of approximately 723 inches per second. A control signal is recorded on the lower edge of the tape and is used to assure proper synchronization of the video head during playback. The main audio signal (Audio 1) is recorded on the upper edge of the tape. A cueing track (Audio 2) is recorded next to the control track and can be recorded after the initial video recording if desired.

The tape wrap around the scanning assembly is 360 degrees, forming a closed collar around the assembly. Each rotation of the video head records one video field, including the vertical sync pulse. This wrap also makes it possible to create an air-lubricating film between the tape and the scanning assembly, virtually eliminating friction, and minimizing the effects of changing temperature and humidity on tape movement.

The IVC-800 uses a single, plug-in video head, eliminating head alignment and matching problems and resulting in complete freedom from the problems of color hue shift and banding common to multi-head recorders.

Use of solid-state components makes the equipment light and therefore extremely mobile. Rugged modular construction and easily-accessible circuit boards render maintenance easy and convenient. Operation is simple, and the recorder can be used at practically any location where the proper power source is available.

Stop motion is provided as a standard feature. This allows the user to momentarily stop the program material being played back on one particular frame of his choice. A separate Stop Motion control is provided for this purpose. Full electrical push-button control of the tape transport permits all tape motion functions to be remotely controlled if desired. A companion color camera, the IVC-100, and a companion color monitor, the IVC MC-19, is also available.



TENSION control eliminates geometric distortion

TRACKING control assures precise tracking

Audio 1 and Audio 2 (cue) record level controls. Audio level meter (switchable)

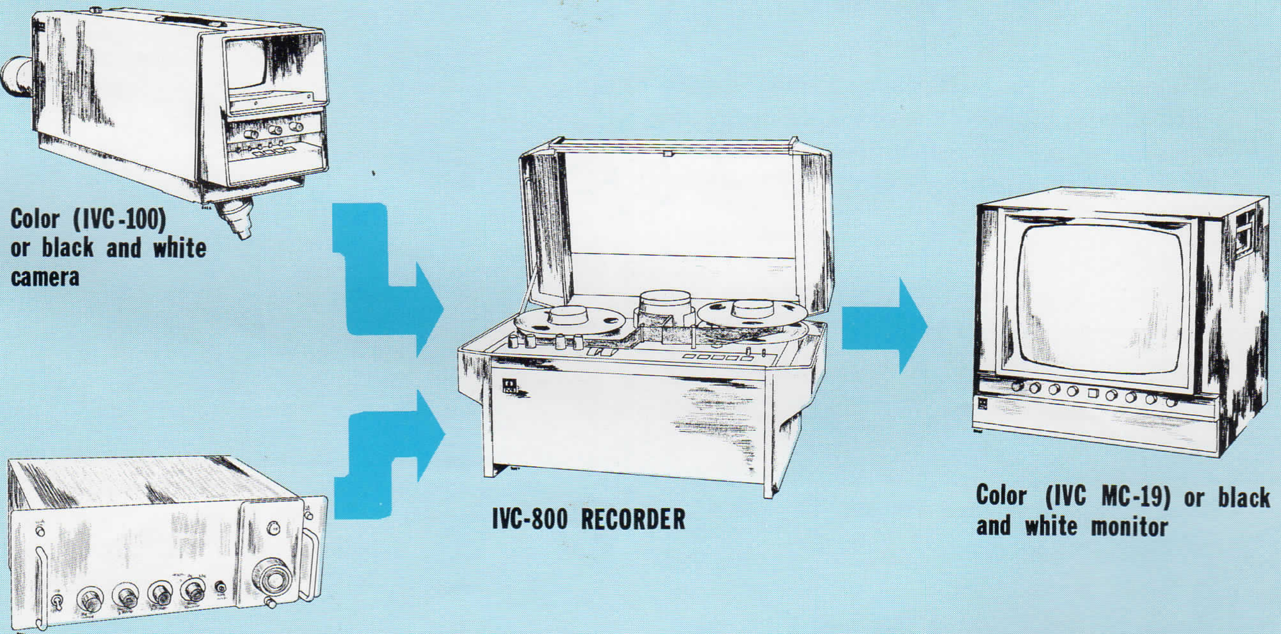
Video record level control. Video record level meter

Tape timer accurately reads program time in minutes and tenths

Compact size, measuring $23\frac{3}{4}$W x $11\frac{1}{2}$H x $13\frac{1}{2}$D

Audio mode switch: Normal position, Audio 1 and Audio 2 (cue) recorded concurrently with Video. Cue position selects Audio 2 only (retains video and audio in playback mode)

Five momentary pushbuttons – PLAY, STOP, FWD, REWIND and RECORD – control all tape motions



Color (IVC-100) or black and white camera

Video-Audio Receiver

IVC-800 RECORDER

Color (IVC MC-19) or black and white monitor

GETTING READY TO OPERATE

THREADING TAPE ON THE RECORDER

The tape used with the recorder is 1 inch in width. Approximately 2150 feet of tape is required for a one hour program. It is strongly recommended that the tape be threaded on the recorder with the power turned OFF. This will help avoid damage to the tip of the rotating video head. To thread the tape, refer to figures A through H and proceed as follows:

Step 1:

Install an empty reel on the take-up (right hand) reel hub. (Figure A)

Step 2:

Install a reel of tape on the supply (left hand) reel hub and spool off 3 to 4 feet of tape from the reel. (Figure B)

Step 3:

Bring the tape around the outside of the first tape guide, past the video erase head, and around the outside of the second tape guide. (Figure C)

Step 4:

Place the tape between the capstan and the capstan idler, past the audio head stack, around the left side of the left scanning drum tape guide. (Figure D)

Step 5:

Place the tape between the right hand scanning drum guide and the scanning drum so that the tape will be going around the scanning drum in a counterclockwise direction. (Figure E)

Step 6:

After going counterclockwise around the scanning drum, bring the tape around the right side of the right hand scanning drum tape guide. (Figure F)

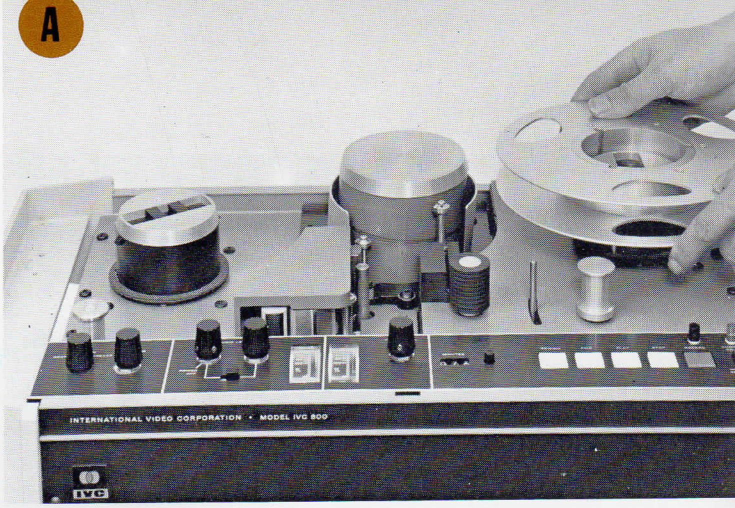
Step 7:

Place the tape in the groove of the end-of-tape sensor and then around the left side of the timer pulley. (Figure G)

Step 8:

Pass the tape behind the trip arm, then around the last tape guide. Wrap the tape around the take-up reel in a counterclockwise direction, making sure that the tape firmly grips the reel. (Figure H)

A



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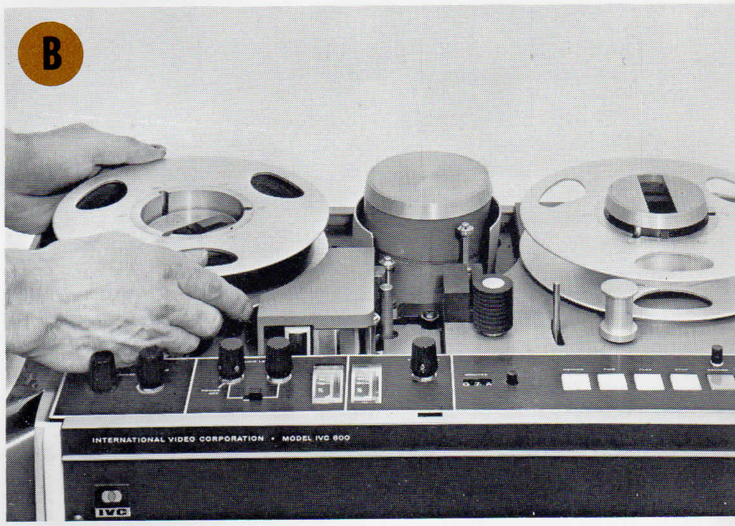

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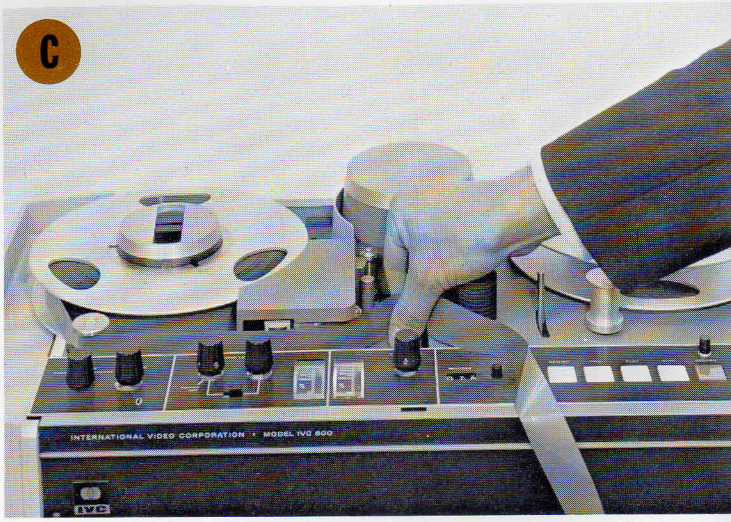

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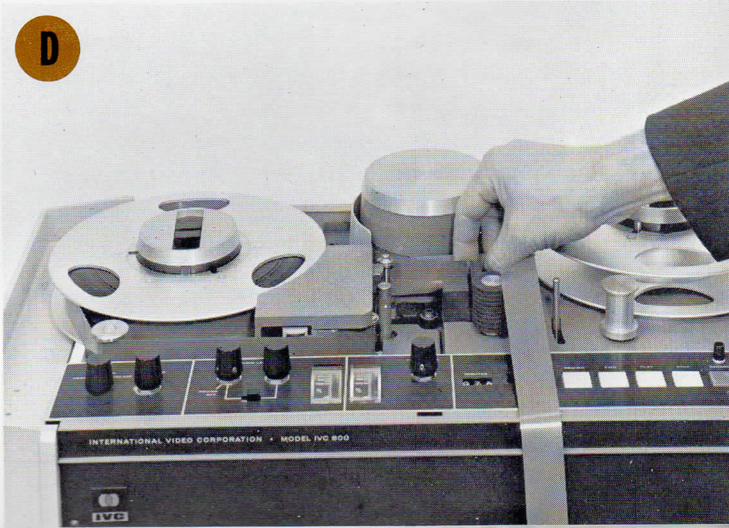

Step 9:

Press the PLAY pushbutton (#14 on page 20), wait approximately ten seconds then press the STOP pushbutton (#15 on page 20). This provides some slack in the tape so that it is not wrapped tightly around the scanning drum.

APPLYING POWER

Once the recorder has been connected as outlined on pages 17 through 19 and the tape has been threaded as outlined above, a-c power can be applied to the recorder. To apply power, turn the POWER/AUDIO 1 LEVEL control (#4 on page 20) clockwise. Only a slight movement of the control is required and the head drum should start rotating.

FAST WINDING

The purpose of the FWD (forward) and REWIND pushbuttons (#12 and #13 on page 20) is to move the tape rapidly from one reel to the other. Using these pushbuttons, a full reel of tape can be wound from one reel to the other in less than 90 seconds. These functions are also used to rapidly locate a particular portion of the recorded material within the reel of tape. The timer can be used to great advantage for locating the material if the location is known (see page 12).

To check fast winding operation, press the FWD pushbutton. The tape should start to wind onto the take-up reel and increase rapidly in speed. After a few seconds, stop the tape (see below) then press the REWIND pushbutton and allow the tape to unwind off the take-up reel. When the tape has come completely off the reel, the end-of-tape sensor should operate and all rotation of the reels should stop (note however that the head drum will continue to rotate).

STOPPING TAPE MOTION

To stop tape motion, either from standard operating speed or from one of the fast winding speeds, merely press the STOP pushbutton (#15 on page 20). This stops tape motion and returns all functions to standby.

It is recommended that, after stopping tape motion from one of the fast winding speeds, the PLAY pushbutton (#14 on page 20) be pressed and then press the STOP pushbutton again. This provides the proper amount of slack in the tape.

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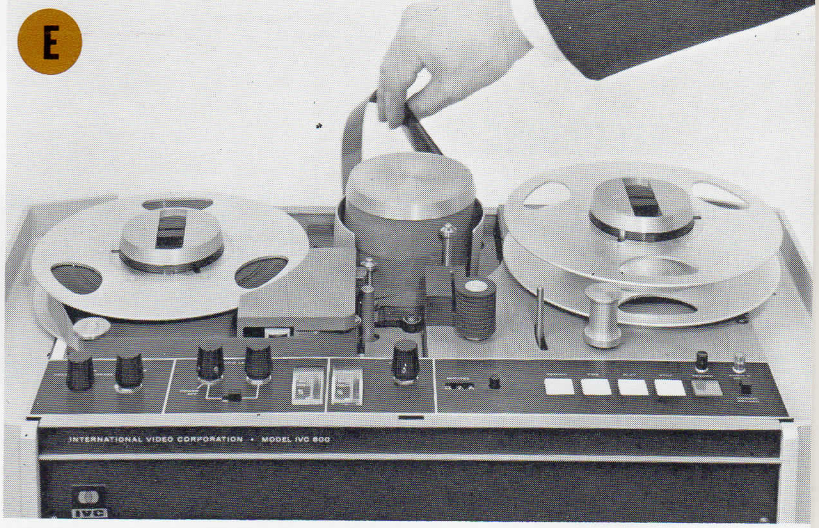

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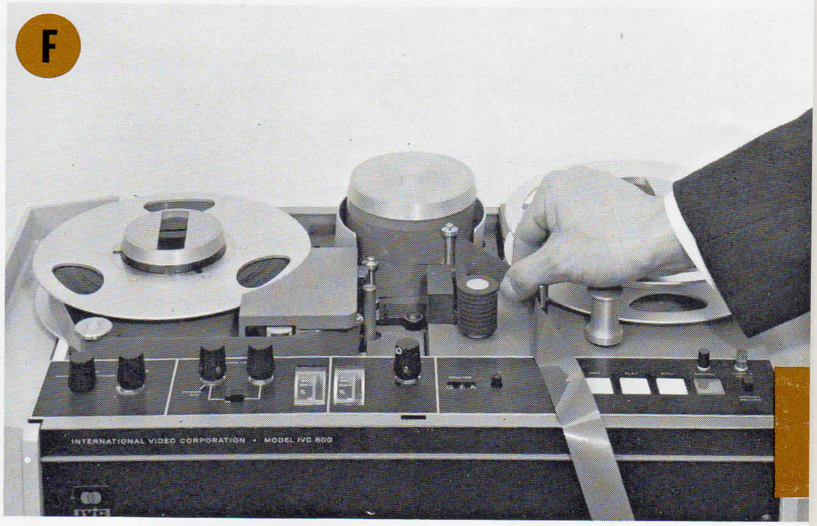

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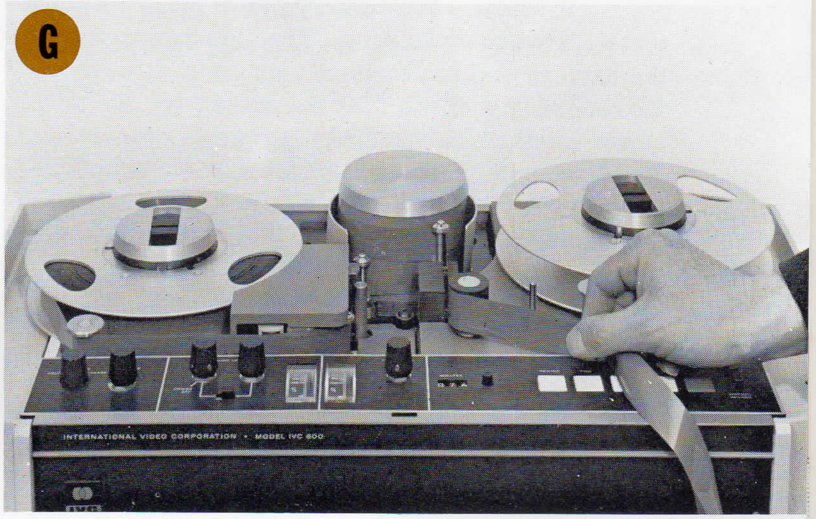

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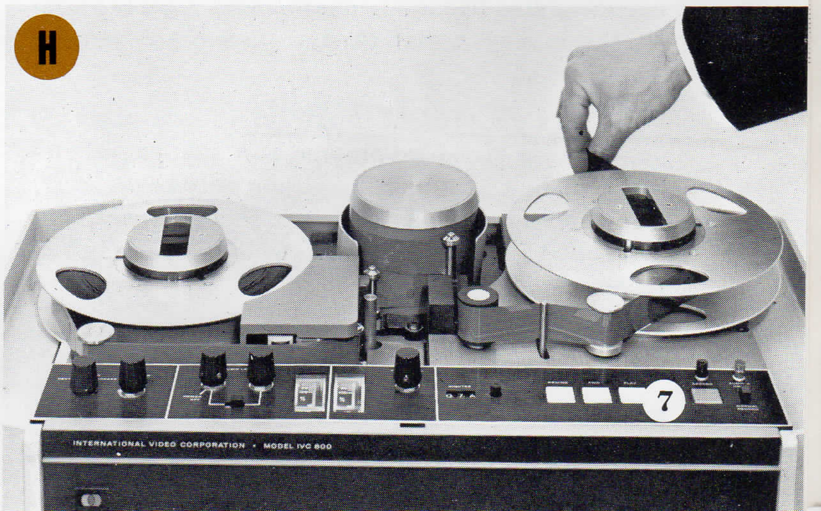


PLAYBACK

GENERAL

Playback of previously recorded tapes is basically a simple procedure: threading the tape (unless of course the recording has been made just prior to playback), making sure that the monitoring equipment (both audio and video) is properly connected and then pressing the PLAY pushbutton.

Several controls on the recorder are used only in playback to help obtain a good quality, stable picture. These are the TENSION, TRACKING, and color lock controls and there use will be explained in detail later on these pages.

If the tape should become worn through repeated use, 'drop outs' can occur. A 'drop out' is illustrated in Figure C and can be a serious problem from the standpoint of picture quality. Drop outs can also be caused by dirt or other foreign matter on the tape itself. Care of the tape, while in use and while being stored, is important. The only remedy for a severe number of drop outs is to re-make the recording using a new reel of tape.

PLAYBACK PROCEDURE

With the recorder properly connected (see pages 17 through 19), a recording previously made on an IVC-800 recorder can be played back as follows:

Step 1:

Thread the previously recorded tape on the recorder (see page 6) and locate the desired program material (see pages 7 and 12).

Step 2:

Press the PLAY pushbutton (#14 on page 20). The recorder will now be in the play mode.

CAUTION

Do not press the RECORD pushbutton as the recording will be erased.

Step 3:

Starting from the extreme counterclockwise position, slowly adjust the TRACKING control (#2 on page 20) for the best picture on the television monitor or receiver. Note that the TRACKING control is effective only during playback. The TRACKING control may cause hue changes during adjustment. (See 'Tracking and Tension' below.)

Step 4:

Adjust the TENSION control (#1 on page 20) so that the top of the picture, as viewed on the television monitor or receiver, is straight and not bent to the left or right. The TENSION control is effective only during playback. (See 'Tracking and Tension' below.)

NOTE

Both the audio and the video output levels are factory adjusted to provide a nominal +4 dbm 600 ohm audio output and a 1 volt peak-to-peak 75 ohm composite video output.

TRACKING AND TENSIONING

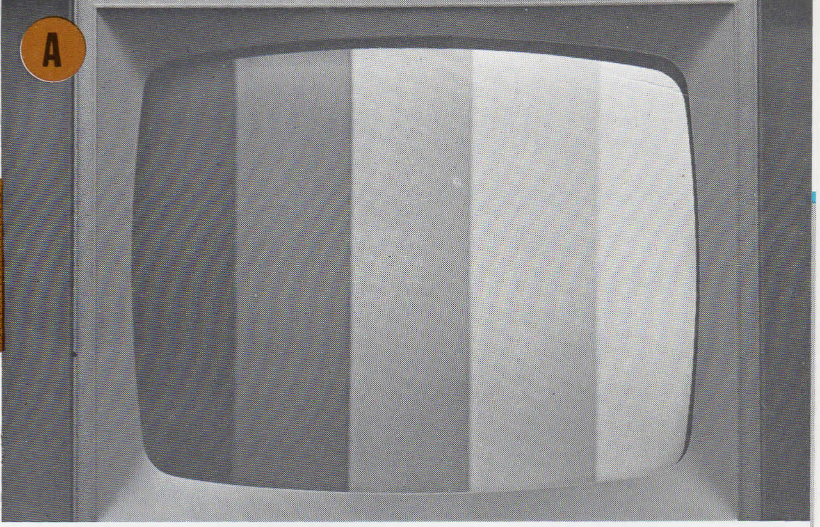
The TRACKING and TENSION controls are used during playback to match, as closely as possible, the conditions existing when the recording was made. The controls are, in effect, "fine tuning" controls.

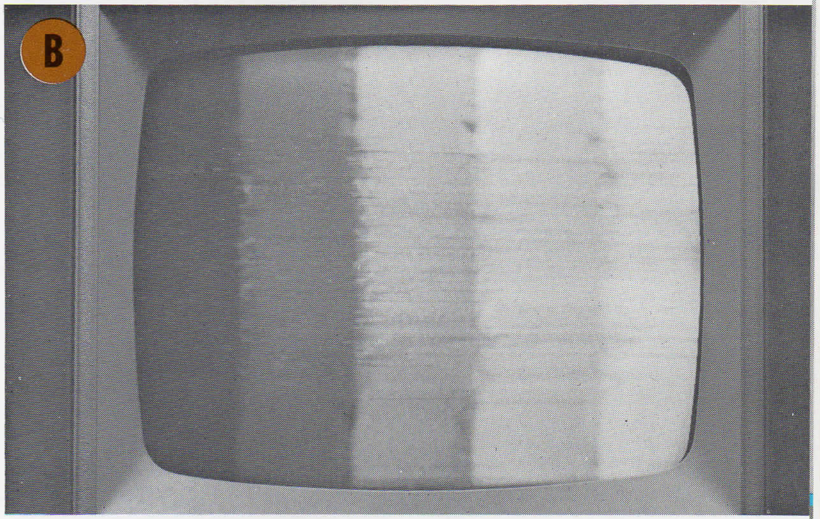
Because of many possible variations, the controls cannot be permanently adjusted. Some of the variations include: (1) the effects of humidity and temperature; (2) the recording may have been made on a different recorder which may have had slightly different tracking and tensioning characteristics; and/or (3) the tape may have become stretched since it was recorded. The following paragraphs describe the effects of the TRACKING, TENSION and color lock controls.

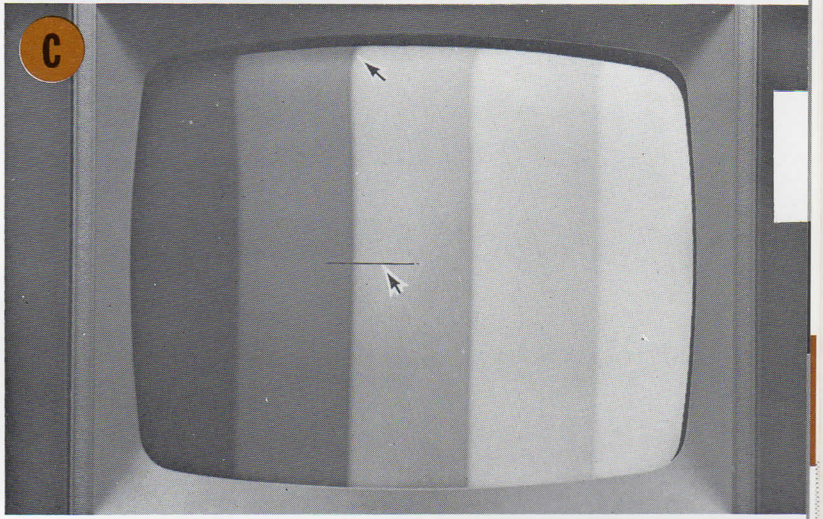
The TRACKING control effectively adjusts the instantaneous head position relative to the position of the moving video tape. The positioning is controlled through control track pulses that are recorded simultaneously with the video signal. In playback, adjusting the TRACKING control varies the relative head position. It is adjusted for the best possible picture without tearing at the top or bottom or any other part of the picture. Figures A and B show a comparison between a normal picture (A) and a distorted picture caused by improper tracking (B).

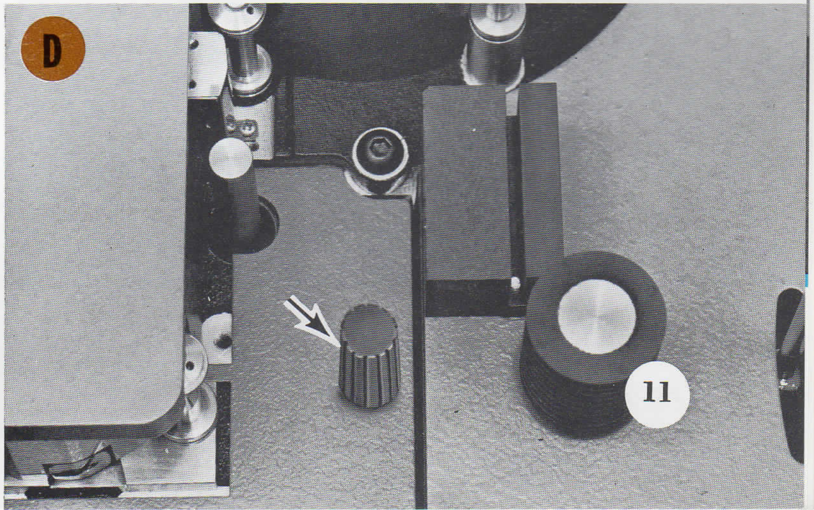
The TENSION control varies the take-up pull on the tape from the take-up reel. It consequently results in varying tape stretch. This effect is especially noted at the top of the picture. It should be adjusted for the straightest vertical lines (or least hook) at the top of the picture. See Figure C for an illustration of distortion caused by improper tensioning and compare it with the normal picture (A).

The color lock control (Figure D) is a fine tuning control for the color processor. If the color processor is not locked, vertical color bands will be seen over the picture instead of the normal color picture. A re-adjustment of the color lock control will eliminate color banding in the reproduced picture.









MAINTENANCE NOTES

MAINTENANCE AND THE DEALER

As with any precision equipment, lubrication and alignment is necessary from time to time. With average use, lubrication and alignment is recommended once a year (or every 1000 hours of actual use) in order to keep your IVC recorder in the best operating condition. Your IVC representative is best equipped to handle this normal preventive maintenance, in addition to corrective maintenance should it be needed. If corrective maintenance becomes necessary, your IVC representative's service engineer would appreciate as much information as possible concerning symptoms of the malfunction as well as the model and serial number of your equipment.

VIDEO HEAD REPLACEMENT

All magnetic recording tape is abrasive and will gradually wear out the video head assembly. Because of the wide bandwidth of video signals, the tape must travel past the video head at a very high speed (compared to the speed necessary for audio recording). For this reason, the video head needs to be replaced considerably more often than the audio heads.

Since the wear of the head is gradual, the degradation of the video signal will not be noticeable until the head approaches the end of its useful life and should be replaced if old recordings cannot be played back or new recordings made. Unless the head is damaged, it will last for at least 500 hours of operation.

To replace the video head, refer to Figures A and B and proceed as follows:

Step 1:

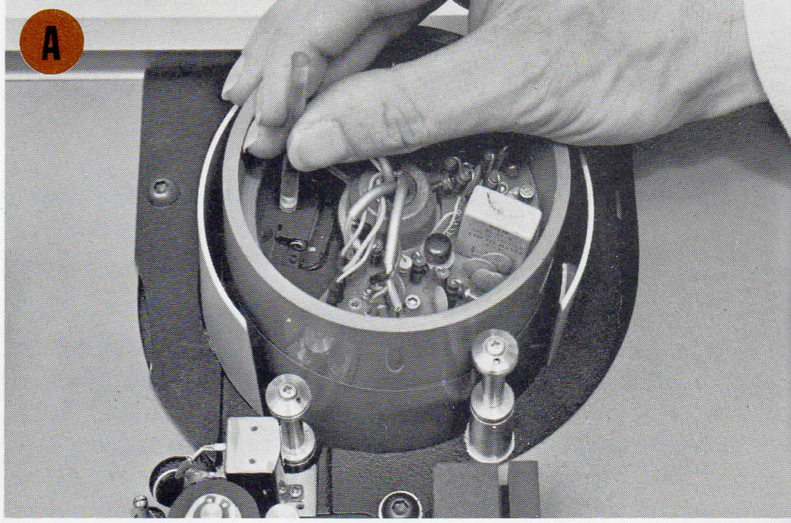
Lift the cover off the top of the scanning drum and remove the tool from inside the cover.

Step 2:

Rotate the scanning ring until the video head is visible through the hole in the top of the scanning assembly.

Step 3:

Carefully screw the tool in the video head and gently slide the head back toward the center shaft of the scanning assembly and then gently lift it up. It may be necessary to use a small screwdriver to aid in sliding the head back.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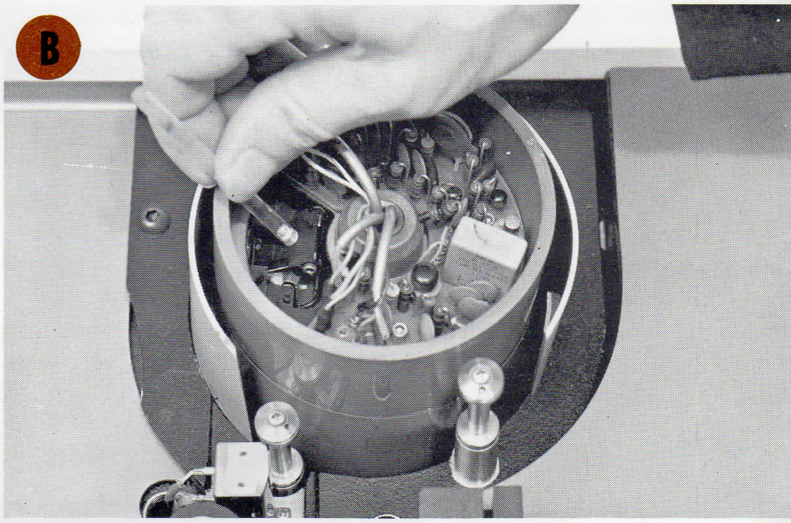
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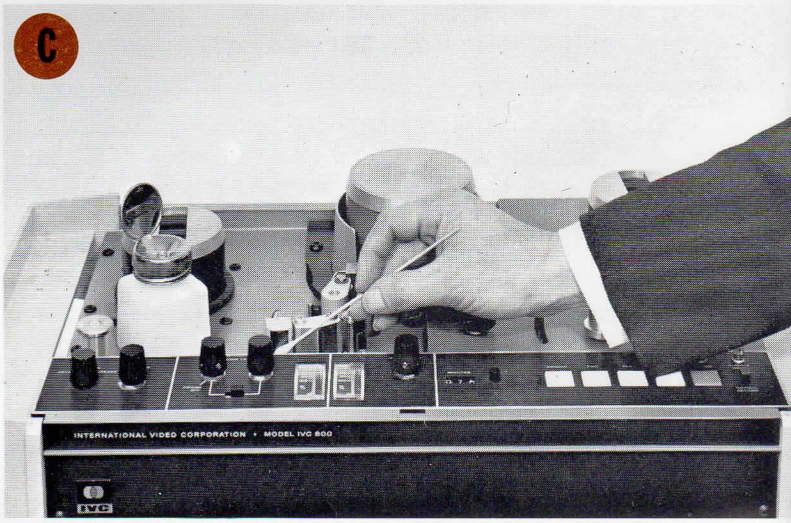
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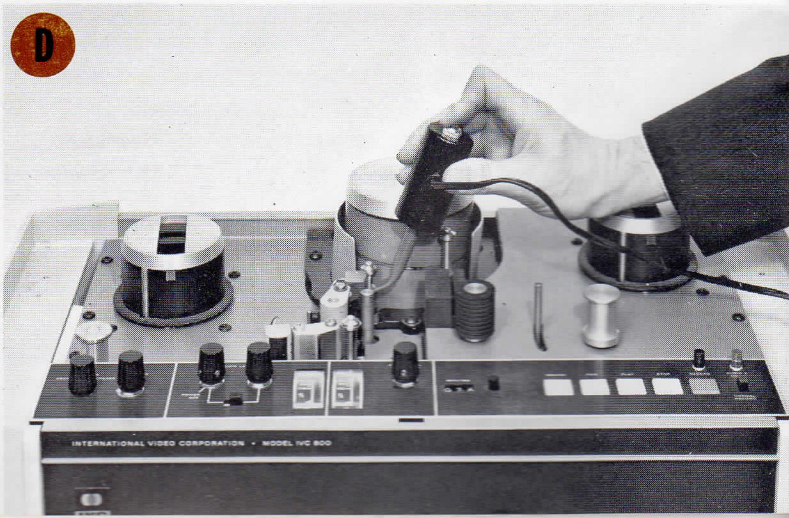

D

Step 4:

Unscrew the tool from the old video head and screw it in the new head. Carefully insert the new head into the cavity from which the old head was removed. Be particularly careful when inserting the tip of the head under the wire spring. Again, the screwdriver may be needed to slide the head in place. Make certain the head is properly seated.

Step 5:

Unscrew the tool from the head and insert it back in the cover. Install the cover on the scanning drum.

CLEANING

Cleanliness of all parts of the tape drive system is required for consistent optimum performance. The heads, capstan, capstan idler and tape guides should be cleaned once every eight hours of actual use, preferably just prior to making or playing back a recording.

Clean all parts using a lintless cloth moistened with iso-propyl alcohol (rubbing alcohol). This cleaning is of utmost importance as most tape manufacturers lubricate their tapes and the lubricant will gradually form a coating on the components in the tape threading path, which will result in a loss of positive drive at the capstan, dropouts, flutter and wow, poor high frequency response, or complete loss of picture.

CAUTION

It is imperative that only iso-propyl alcohol be used for cleaning the capstan idler wheel (rubber).

The fixed type heads should be cleaned using a cotton swab moistened in either a solution of Xylene and 0.1% Aerosol or iso-propyl alcohol. DO NOT USE ANY OTHER SOLVENTS ON THE HEADS, or you may damage them. Never use an abrasive or any metallic object which might cause scratches or nicks.

The rotating video head should be cleaned using a clean lintless cloth moistened with the head cleaning solution (Xylene). Use EXTREME CARE when cleaning the video head. (Figure C)

DEMAGNETIZING THE HEADS

Occasionally the heads may become slightly magnetized through continued use. If this condition is not corrected, you may find the noise level of your tapes increasing, recorded signals becoming distorted and, in extreme cases, the high frequencies on recorded tapes gradually being erased. This condition can be corrected by demagnetizing the heads with a head demagnetizer. To use the demagnetizer, see Figure D and proceed as follows:

Step 1:

Make sure that the recorder power switch is in the OFF position.

Step 2:

Connect the demagnetizer to a source of 110-120 volt, a-c power.

Step 3:

Bring the tips of the demagnetizer in close proximity to, but not in contact with, the video erase head so that the tips straddle the gap in the center of the head, run the tips up and down the head several times, and then slowly withdraw the demagnetizer. The slow withdrawal is essential to proper demagnetization.

Step 4:

Repeat step #3 at the audio 2 head stack. Note that there is both an erase and a record/playback element. Be sure to demagnetize both elements.

Step 5:

Repeat step #3 at the control/audio 1 head stack. Note that there are two separate tracks and that both are at an angle.

Step 6:

Locate the video head in the scanning drum and repeat step #3 at the video head.

Step 7:

Disconnect the demagnetizer.

MAINTENANCE MANUAL AVAILABLE

The maintenance procedure handbook describes the checkout and alignment procedures (both mechanical and electronic) necessary for proper operation. In addition, it provides complete replacement parts lists. Note that sufficient background in electronics and access to the proper tools and test equipment is necessary for proper alignment. The manual (#15-208010) for your recorder is available through your IVC representative.

consists of mounting the equipment in addition to connecting the required cables.

Dimensions and space requirements for the recorder are shown in the illustration on page 17. It is important that sufficient space be planned for at the rear of the equipment to allow the cabling to be installed and to provide proper ventilation for the recorder.

UNPACKING

Carefully unpack all equipment and check to determine that all the units are complete. Save the shipping carton and packing material for possible future shipment. Remove all tape and twine that was used to secure parts during shipment. Examine the springs, contacts, and other moving parts of switches, motors, etc., for foreign matter that may have become lodged in these spots.

> CAUTION
>
> NEVER lift the recorder using the scanning assembly. Serious damage can result.

Carefully inspect all equipment for evidence of shipping damage. If there should be any such evidence, stop unpacking as soon as the damage is discovered. Notify the carrier of the damage and arrange to have the shipment inspected by the carrier's agent or authorized representative. DO NOT DELAY. Inform the carrier of intent to file claim, then notify your IVC representative immediately.

INSTALLING THE EQUIPMENT

PORTABLE MODELS

The portable models are shipped in a ready to operate condition except for the connection of the cables. Sufficient space has been provided on the bottom of the case for cable connections and proper ventilation. The lips along each side of the case form convenient carrying handles. See the 'Connections' paragraphs, below, for the required cabling.

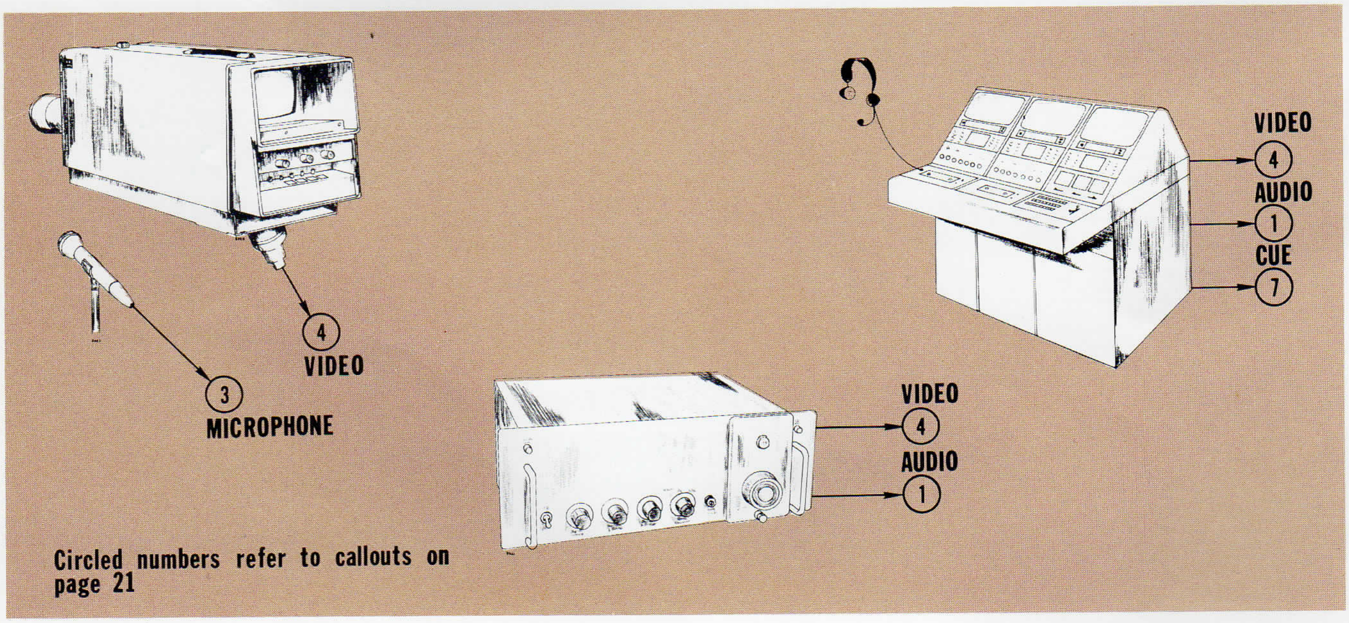
RACK MOUNTED MODELS

When rack mounting is desired, the equipment may be mounted in any rigidly constructed standard 19-inch cabinet rack or equivalent. The mounting rails should be straight and sturdy. The 'Mounting Dimensions' illustration indicates the amount of rack space and clearance required. The installation procedure to be followed depends to a large extent upon the user's requirements and the type of rack or cabinet in which the recorder is to be mounted. No particular precautions are necessary beyond the obvious careful handling. See the 'Connections' paragraphs, below, for the required cabling.

CONNECTIONS

SINGLE CAMERA AND MICROPHONE SOURCE

To connect the recorder to a single camera, such as the IVC-100, and a single low impedance microphone (50 to 250 ohms), all that is



Circled numbers refer to callouts on page 21 necessary is to plug the cables from the camera and the microphone into the recorder and to connect the camera and recorder to a source of 117 volt AC power. The video signal cable should be of the 75-ohm type such as RG-11/U or RG-59/U and should have a 'UHF' type connector (PL-259) at the recorder end of the cable. The connector at the camera end of the cable will depend on the camera. The microphone should be connected to the recorder using regular microphone cable with a standard two-circuit phone plug (PJ-055B) at the recorder end of the cable.

NOTE

> Unless otherwise noted, the military designation for cable and connectors is indicated. Any commercial equivalent is normally acceptable.

MULTIPLE CAMERAS AND/OR MICROPHONES

The connection of multiple cameras and/or microphones requires the use of added equipment such as a switcher or a fader between the cameras and the recorder and/or a mixer between the microphones and the recorder. The cameras and microphones should be connected to the fader, switcher, and/or mixer in accordance with the instructions supplied with that equipment. The output from the switcher or fader should be connected to the recorder using a 75-ohm cable (RG-11/U) with a 'UHF' type connector (PL-259) at the recorder end. The output of the mixer should be connected to the recorder using regular two-conductor shielded cable with a Cannon XLR-3-12C connector at the recorder end.

INDUSTRIAL VIDEO-AUDIO RECEIVER SOURCE

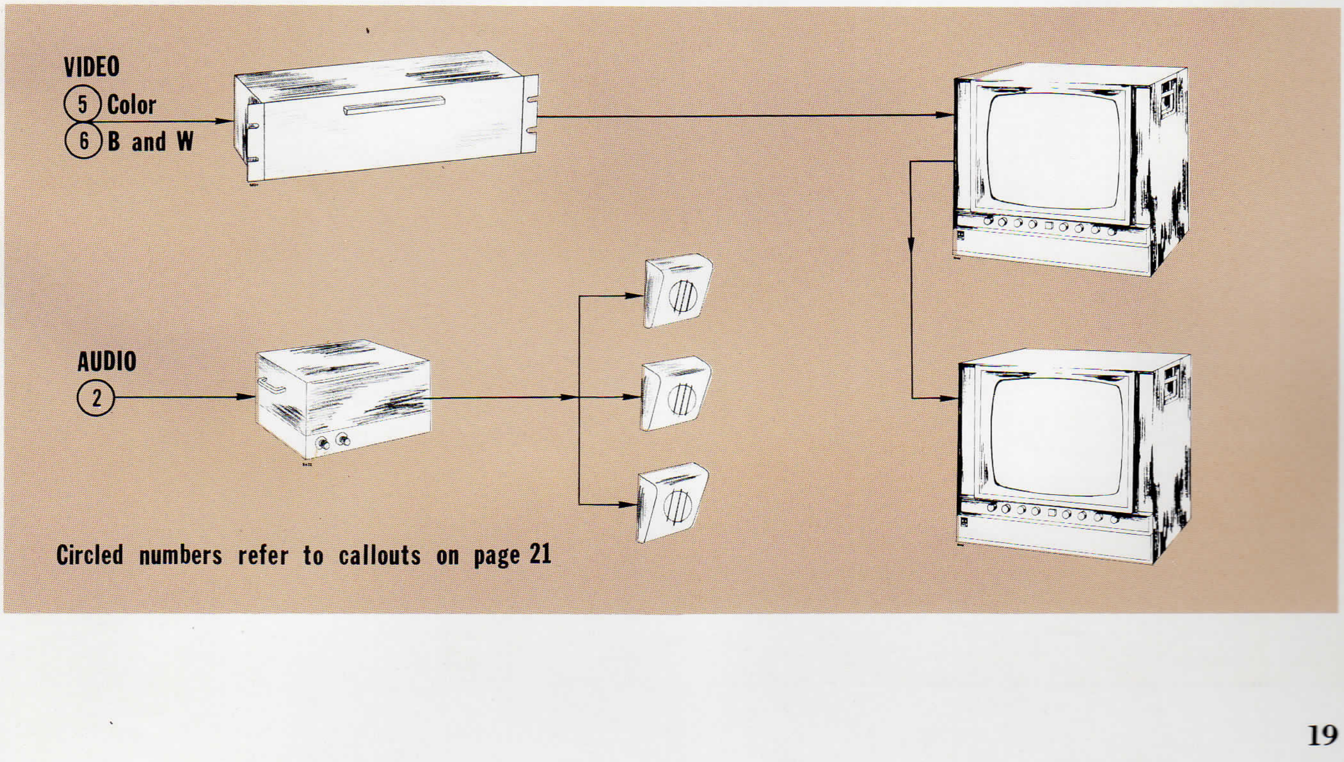
The video output of an industrial video-audio receiver should be connected to the recorder using a 75-ohm cable (RG-11/U) with a 'UHF' type connector at the recorder end. The audio output of the receiver should be connected to the recorder using regular two-conductor shielded cable with a Cannon XLR-3-12C connector at the recorder end.

MONITORS

To monitor the video output of the recorder, use a 75-ohm cable with a 'UHF' type connector at the recorder end. Connect the cable from either the B&W OUTPUT connector or the COLOR OUTPUT connector (depending on the video monitor) to the monitor (either directly or through an appropriate distribution system). The audio output can be monitored using any normal amplifier-speaker combination. The cable should have a Cannon XLR-3-11C connector at the recorder end and the amplifier should present a minimum load of 600 ohms.

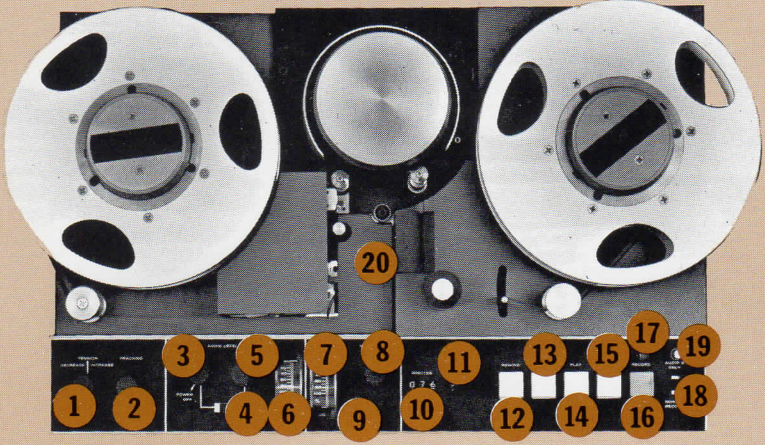
INSTALLATION INSTRUCTIONS BOOKLET

Unpacking, installation (including checking the operation of the recorder) and, if needed, repacking the recorder for future shipment is covered in much greater detail in the Installation Instructions Booklet (#15-108010) enclosed with your recorder.



Circled numbers refer to callouts on page 21

OPERATING CONTROLS



1 TENSION control: For playback only, adjust for least hook (pulling) at top of picture.

2 TRACKING control: For playback only, slowly adjust for best picture.

3 POWER/AUDIO 1 LEVEL control: Turns recorder power 'on' (just clockwise from POWER OFF position). Adjusts recording level of audio channel 1 as viewed on audio meter (6) when selector switch (4) is in left position.

4 Selector switch: Switches audio meter (6) so that indication is for either audio channel 1 (left) or audio channel 2 (right).

5 AUDIO 2 LEVEL control: Adjusts recording level of audio channel 2 as viewed on audio meter (6) when selector switch (4) is in right position.

6 Audio meter: Indicates audio signal level of channel selected by switch (4). Level shown is either record or playback depending on function selected.

7 Video meter: Indicates record level only of video signal as controlled by VIDEO LEVEL control (8).

8 VIDEO LEVEL control: Adjusts level of video signal recorded on tape as indicated by video meter (7).

9 STOP MOTION switch: While in PLAY mode, push to the left to stop the reproduced picture at a particular frame.

10 Timer: Indicates tape passage in MINUTES and tenths of minutes.

11 Timer reset pushbutton: Press to return timer to '000'.

12 REWIND pushbutton: Press to fast wind tape from take-up to supply reel.

13 FWD pushbutton: Press to fast wind tape from supply to take-up reel.

14 PLAY pushbutton: Press to play back a previously recorded tape. See RECORD pushbutton (16) below.

15 STOP pushbutton: Press to stop any function in process.

16 RECORD pushbutton: Press simultaneously with PLAY pushbutton (14) to record video and audio on tape.

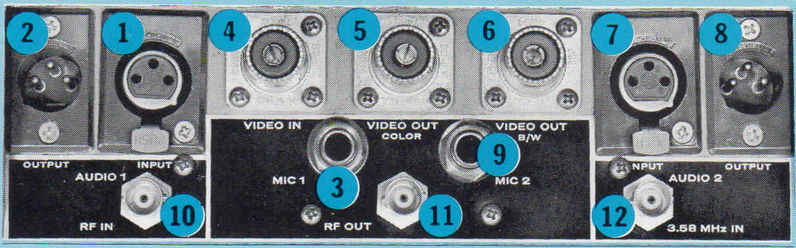
17 RECORD indicator: Lamp lights when recorder is recording (cue switch (18) in NORMAL RECORD position).

18 Cue switch: In NORMAL RECORD position, the audio 2 channel is recorded along with audio 1 and video. In the AUDIO 2 ONLY position, the audio 2 channel is recorded while monitoring audio 1 and video.

19 AUDIO 2 ONLY record indicator: Lamp lights when recorder is recording audio 2 channel only (cue switch (18) in AUDIO 2 ONLY position).

20 Color lock control: For playback only, adjust for elimination of vertical color banding.

SIGNAL PANEL



1 AUDIO 1 INPUT: 600 ohms, -20 dbm to +16 dbm.

2 AUDIO 1 OUTPUT: 600 ohms, +4 dbm nominal.

3 MIC 1 input: 200 ohms (lo-z), 0.4 mv minimum.

4 VIDEO IN: 75 ohms, 1 v p-p, b/w or NTSC color.

5 VIDEO OUT, COLOR: 75 ohms, 1 v p-p composite.

6 VIDEO OUT, B/W: 75 ohms, 1 v p-p composite.

7 AUDIO 2 INPUT: 600 ohms, -20 dbm to +16 dbm.

8 AUDIO 2 OUTPUT: 600 ohms, +4 dbm nominal.

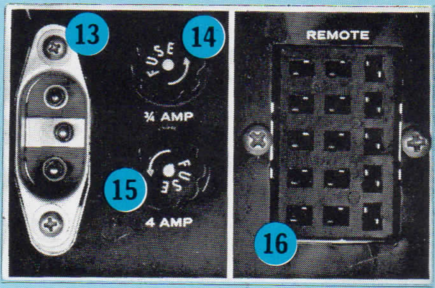
9 MIC 2 input: 200 ohms (lo-z), 0.4 mv minimum.

10 RF IN: (accessory item)

11 RF OUT: (accessory item)

12 3.58 MHz IN: (accessory item)

POWER PANEL



13 A-C Power Input: 115 volts a-c.

14 Electronic Fuse: 3/4 AMP.

15 Equipment Fuse: 4 AMP.

16 REMOTE CONTROL: To connect remote control assembly for remote operation.

IVC

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